SUPERVISION: DOUBLE PANORAMA ON THE IFA 2000 LINK

FRANCE TO ENGLAND INTERCONNECTOR

IFA 2000 is an undersea cable providing a direct voltage electrical link between France and the United Kingdom. As part of their work to improve this link, the companies responsible for its management, RTE and National Grid, have selected the Panorama SCADA software package from Codra. But similarities stop there. The areas supervised on either side of the channel are diametrically opposite, thereby demonstrating the flexibility of the Panorama solution.

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On the French side (right), RTE remotely manages exchanges from its regional dispatching center in Lomme. On the English side (left), all the installations at the Sellindge site are supervised via six operator workstations.

The IFA 2000 undersea link came into service in 1986 to allow electricity exchanges between England and the rest of Europe. With a power rating of 2000 MW, this interconnection is crucial to the safety and fluidity of the pan-European transmission system.

The interconnection required the construction of two converter substations to convert AC current into DC current, one on either side of the Channel. One is located at Les Mandarins, near Calais, the other at Sellindge, in Kent. The direct current link is used to connect the two networks without having to synchronize their frequencies, and therefore decouples the French and English networks. The converters also make it possible to accurately and quickly regulate the level of power exchanged, and can therefore be used to quickly schedule exchange programs sent by users of the link to RTE and NGC (National Grid Company), the French and English transmission system operators. These companies each own half of the IFA 2000 link and work alternately to ensure its operation.

The joint management of the link and its organization meets the needs of all of its users, and work has begun on both sides of the Channel to further improve operations. This "entente cordiale" is unusual in that both operators are free to make their own technical choices.

For supervising the link, both RTE and National Grid opted for a Panorama solution from Codra -- but they use it for very different purposes.

FRANCE: AUTOMATING EXCHANGES

On the French side, equipment for managing the link is located at two sites: there is a converter sub-station at Les Mandarins, near Calais, and a main control station is located in the RTE regional dispatching center at Lomme, outside Lille.

For RTE, the renewal of equipment at the main control station began in 2002 in order to automate the exchanges. Since the opening of the electricity market, link capacities are allocated via bidding on an annual to daily basis in both directions: import and export (see the sidebar for details). This results in constantly changing power fluctuations, requiring the operator to periodically update its operating programs. Previously these operations were performed manually, but now they are automated so that the system can format data in order to control the equipment at the Les Mandarins sub-station. Following a call for tenders, RTE chose Cap Gemini, and a custom solution was developed based on the latest version of Panorama E2 under Windows. The development phase lasted 18 months until late 2006. The system was tested under "controlled operating" conditions between February and June 2007, and "basic operations" began in August 2007.

The solution developed by Cap Gemini is based on a client/server architecture using the Panorama software for both controlling and acquiring supervisory data. This is an original solution insofar as custom developments are embedded directly in the Panorama architecture, which greatly facilitates the integration of technical know-how. Overall, the application comprises about 45% custom components and 55% standard Panorama components. As a result, the development workload was 3.6 times less than when relying on custom programming. This approach also significantly shortened the debugging period and provided a powerful, robust solution from day one.

The hardware architecture includes a SCADA server and three operator workstations, normally controlled by a single operator for tracking real-time operations. The supervisor, or process viewer, displays trends and graphs -- previously prepared by operators -- in order to preprogram exchanges. The system manages fewer than 5,000 variables -- a very low number for Panorama, which is designed to handle over 100,000 event-driven variables.

ENGLAND: INSTALLATION MANAGEMENT

On the English side, all installations are grouped at Sellindge, in Kent. Exchanges are managed 24 hours a day by technicians who are able to react very quickly to customer demands via system operators. National Grid decided to invest in the supervisory control of the site's technical installations.

The former Honeywell DP System had become obsolete by 1998, and it was replaced by the Panorama/Rochester equivalent, initially running Panorama V7 under Windows NT4. As part of a maintenance program initiated in 2004, this system was upgraded to Panorama V8 and Windows XP Pro in 2005. The technical management system was enhanced in 2006 with a network of 24 WiFi access points, enabling technicians to access data on tablet PCs running a client version of the SCADA software. The solution includes a feature for sending bilingual e-mail. A VoIP telephone system was added in 2007. All these changes have been managed by Edinburgh-based Elisys Engineering, the leading Panorama Certified Integrator (PCI) in the United Kingdom. Running on two redundant servers, the supervisory system includes six operator workstations providing a global view of site operations, including technical infrastructure management, fire safety, access control, and video surveillance. This same global view is also available on mobile Tablet PCs. Panorama continually monitors the status of the 24 WiFi hotspots

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Technicians use mobile Tablet PCs to access from anywhere on the site all the supervisory information available on operator workstations.

via SNMP, and only one technician is required to supervise operations for the entire site. Information displayed on the screens relates principally to the real-time status of alarms and events, the acknowledging and resetting of alarms, the historical analysis and trend graphs, and the recording of measurements (temperature, pressure, volume, etc.). Overall, the system manages 20,000 alarms triggered by 9,000 digital sensors, 1,000 analog sensors, and 800 variables. All inputs are duplicated with two physical inputs per device or variable, and the Panorama software checks for any discrepancies from both sources in real time. All alarms are recorded in an alarm history file with their 1- millisecond resolution. The latter being very important for analyzing cascading events, was also a key requirement for National Grid and a decisive factor, along with the redundant data acquisition capability and the extensive alarm management, in the company's decision to choose Panorama. ■

Allocating capacity through bidding

With the opening of energy markets, and in order to guarantee the strictly equitable, nondiscriminatory assignment of rights to share the IFA 2000 link among all market players, RTE and National Grid set up a coordinated bidding system in April 2001 to ensure the fluidity and transparency of electrical exchanges, while providing a secure energy supply.

A mutual aid agreement guarantees that both operators have priority access to reserves with a capacity of up to 1,000 MW. In both directions, various types of products are open to bidding according to annual, quarterly, monthly, or daily periods, and divided into 48 half-hour segments. Bidding results are published daily, and capacity not used by customers is reassigned based on the "use it or lose it" principle.